

Tribhuvan University
Central Department of Computer Science & Information Technology
Bachelor of Computer Science and Information Technology - Third Semester
Model Question Paper

Course Title: Operating System

Full Marks: 60

Course No.: CSC 203

Pass Marks: 24

Section A

Any two questions:

(2x10=20)

1. What is file? Describe the most common system calls relating to files.

OR

What are system calls? Explain the system call flow with the help of a block diagram.

2. Explain the four basic modes of input/output operations.
3. a) How is the Direct Memory Access (DMA) set up?
b) Explain the concept of buffering.
c) How interrupt is enabling and detected?

Section B

Any eight questions:

(8x5=40)

4. What are the main motivations and issues in primary memory management?
5. List some differences between Personal Computer Operating System and Mainframe Operating Systems.
6. Explain the difference between Busy Waiting and Blocking.
7. Explain why two-level and scheduling is commonly used?
8. Explain the Hierarchical Directory Systems with diagrammatic examples.
9. What is the difference between Program and Process?
10. Give briefly at least three different ways of establishing inter-process communication?
11. A system has four processes P_1 through p_4 and two resource types R_1 and R_2 . It has 2 units of R_1 and three units of R_2 . Given that:

P_1 request 2 units of R_2 and 1 unit of R_1

P_2 holds 2 units of R_1 and 1 unit of R_2

P_3 holds 1 unit of R_1

P_4 requests 1 unit of R_1

Show the resource graph for the state of the system. Is the system in deadlock? And if so, which processes are involved.

12. Write short notes on:

- a) File structure
- b) The FIFO page replacement algorithm.

Tribhuvan University
Institute of Science and Technology
2066

Bachelor Level/Second Year/Third Semester/Science

Full Marks: 60

Computer Science and Information Technology (CSC. 203)

Pass Marks: 24

(Operating System)

Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Section A

(2x10=20)

Attempt any two questions:

1. Define the term semaphore. How does semaphore help in dining philosophers problem? Explain.
2. Explain how does file allocation table (FAT) manages the files. Mention the merits and demerits of FAT system. A 200 GB disk has 1-KB block size, calculate the size of the file allocation table if each entry of the table has to be 3 bytes.

OR

Suppose that a disk drive has 100 cylinders, numbered 0 to 99. The drive is currently serving a request at cylinder 43, and previous request was at cylinder 25. The queue of pending request, in FIFO order is:

86, 70, 13, 74, 48, 9, 22, 50, 30.

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms?

- (a) FCFS
 - (b) SCAN
3. Write short notes on:
 - a) Least recently used page replacement algorithm
 - b) Segmentation
 - c) Associative memory.

Section B

(8x5=40)

Attempt any eight questions:

4. What is an operating system? Differentiate between time sharing and real time operating system.
5. Why thread is necessary? In which circumstances user-level thread is better than Kernel level thread?
6. Explain about hierarchical directory systems with diagrammatic examples.
7. How can you define the term process scheduling? Differentiate between I/O bound process and CPU bound process.
8. A system has two processes and three identical resources. Each process needs a maximum of two resources. Is deadlock possible? Explain your answer.
9. What do you mean by interrupt? Explain the working mechanism of interrupt controller.
10. Define the term indefinite postponement. How does it differ from deadlock?
11. Explain the mapping of virtual address to real address under segmentation.
12. Compare the throughput (overall performance) of SCAN with SSTF.

Tribhuvan University
Institute of Science and Technology
2067

Bachelor Level/Second Year/Third Semester/Science
Computer Science and Information Technology (CSC 203)
(Operating System)

Full Marks: 60
Pass Marks: 24
Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Section A

Attempt any two questions: (2x10=20)

1. What is system calls? Explain the system call flow with the help of a block diagram.

OR

What do you mean by file system? What are the major difference between the file system interfaces and file system Implementation.

2. Write short notes on:
 - (a) Disk Scheduling Algorithms.
 - (b) Error Handling and Formatting.
 - (c) File Operations.
3. Consider the following page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the LRU replacement, FIFO replacement, and optimal replacement algorithms? Assuming three, five, or seven frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each.

Section B

Attempt any eight questions: (8x5=40)

4. Differentiate between personal computer operating system and mainframe operating systems.
5. When do page fault occur? Describe the actions taken by an operating system when a page fault occurs.
6. List four necessary conditions for deadlock. Explain each of them briefly what would be necessary (in the operating system) to prevent the deadlock.
7. Draw and describe the 3-state process model.
8. Does window have any concept of process hierarchy? How does parent control the child?
9. What is the problem with thread implementation in user space when any one of the threads gets blocked while performing IO operation?
10. Explain why two-level and scheduling is commonly used.
11. What are the main motivations and issues in primary memory management?
12. Explain the disk management with example.